Trends in the mathematics proficiency of 9-, 13-, and 17-year-olds

Proficiency in mathematics is an important outcome of education. In addition, knowledge of mathematics is critical for success in science, computing, and a number of other related fields of study. In an increasingly technological world, the mathematics skills of the Nation's workers may be a crucial component of economic competitiveness.

- Average mathematics proficiency improved between 1978 and 1994 for all age groups, with the largest improvements occurring among 9- and 13-year-olds. Furthermore, on another mathematics assessment that reflects recent curricular emphasis and mathematics standards developed by the National Council for Teachers of Mathematics, scores increased for 4th-, 8th-, and 12th-graders between 1990 and 1996 (see supplemental table 18-2).
- Several states had significant increases in average mathematics scores between the early 1990s and 1996. Of the 38 jurisdictions in which 4th-graders participated in the assessment in both 1992 and 1996, 16 states had significant improvements in 1996, and of the 36 jurisdictions in which 8th-graders participated, 13 states showed significant improvements in 1996 (see supplemental table 18-3).
- Although whites continue to outscore blacks and Hispanics at all ages, white scores increased at a slower rate than black and Hispanic scores at ages 13 and 17, causing this gap to decrease for these age groups over the last 20 years.
- Between 1978 and 1994, the percentage of 17-year-olds scoring at or above level 250 increased from 92 to 97 percent; those scoring at or above level 300 increased from 52 to 59 percent, but those scoring at or above level 350 stayed at 7 percent (see supplemental table 18-4).

Average mathematics proficiency (scale score), by sex and age: Selected years 1973–94

	Total			Male			Female		
Year	Age 9	Age 13	Age 17	Age 9	Age 13	Age 17	Age 9	Age 13	Age 17
1973	[1]219	[1]266	304	[1]218	[1]265	309	[1]220	[1]267	301
1978	[1]219	[1]264	[1]300	[1]217	[1]264	[1,2]304	[1]220	[1]265	[1]297
1982	[1]219	[1]269	[1,2]298	[1]217	[1]269	[1,2]302	[1]221	[1]268	[1,2]296
1986	[1]222	[1]269	[1]302	[1,2]222	[1,2]270	305	[1]222	[1]268	[1]299
1990	[2]230	[1,2]270	305	[2]229	[1,2]271	306	[2]230	270	303
1992	[2]230	[2]273	307	[2]231	[2]274	309	[2]228	[2]272	[3]305
1994	[2]231	[2]274	306	[2]232	[2]276	309	[2]230	[2]273	304

Average mathematics proficiency (scale score), by race/ethnicity and age: Selected years 1973–94

	White			Black			Hispanic		
Year	Age 9	Age 13	Age 17	Age 9	Age 13	Age 17	Age 9	Age 13	Age 17
1973	[1]225	[1]274	310	[1]190	[1]228	[1]270	[1]202	[1]239	[1]277
1978	[1]224	[1]272	[1,2]306	[1]192	[1]230	[1]268	203	[1]238	[1]276
1982	[1]224	[1]274	[1,2]304	[1]195	[1,2]240	[1]272	204	[2]252	[1]277
1986	[1]227	[1]274	[1]308	[1,2]202	[2]249	[2]279	205	[2]254	283
1990	[2]235	[1]276	310	[2]208	[2]249	[2]288	[2]214	[2]255	284
1992	[2]235	[2]279	312	[2]208	[2]250	[2]286	[2]212	[2]259	[2]292
1994	[2]237	[2]281	312	[2]212	[2]252	[2]286	[2]210	[2]256	[2]291

[1] Statistically significant difference from 1994.

[2] Statistically significant difference from 1973.

[3] Revised from previously published figure.

NOTE: The mathematics proficiency scale ranges from 0 to 500. (See supplemental table 18-1 for detailed explanations of levels.)

Level 150: Simple arithmetic facts

Level 200: Beginning skills and understandings

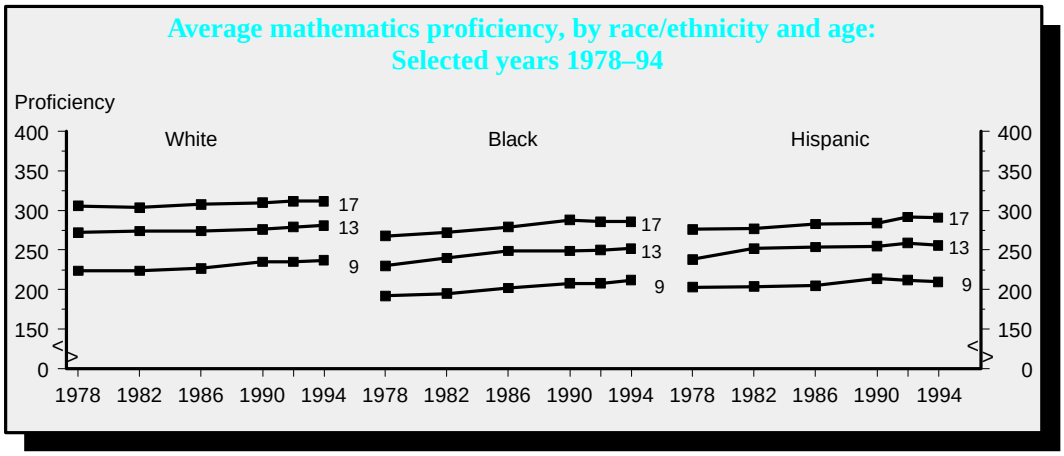
Level 250: Numerical operations and beginning problem solving

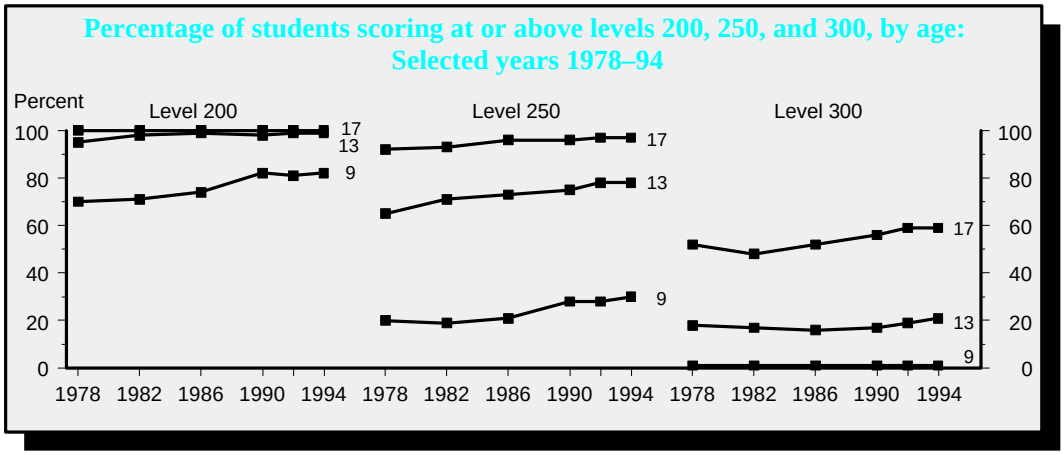
Level 300: Moderately complex procedures and reasoning

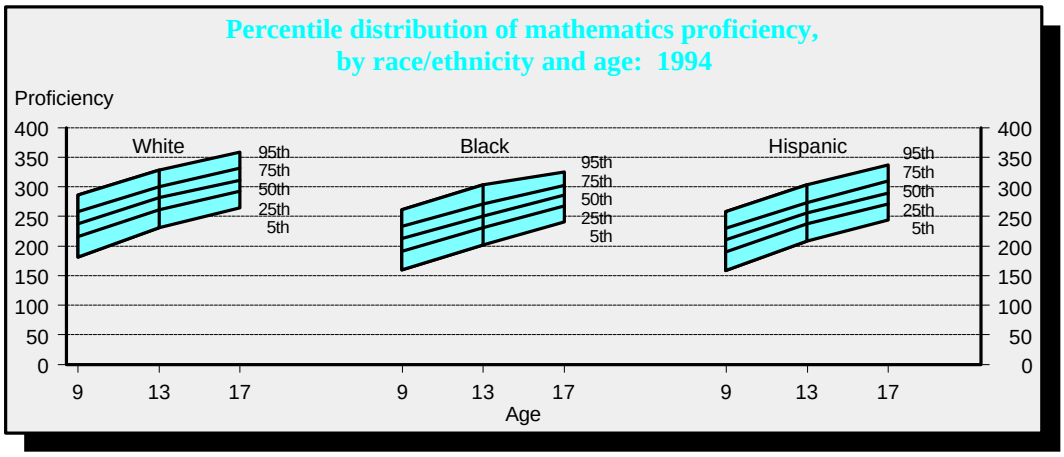
Level 350: Multi-step problem solving and algebra

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, *Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1994; Mathematics, 1973 to 1994; Reading,1971 to 1994; Writing, 1984 to 1994*, 1996.

Average mathematics proficiency (scale score)







NOTE: The mathematics proficiency scale ranges from 0 to 500. (See supplemental table 18-1 for detailed explanations of levels.)

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, *Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1994; Mathematics, 1973 to 1994; Reading, 1971 to 1994; Writing, 1984 to 1994,* 1996.

Table 18-1 Explanations of levels of mathematics proficiency

Level 350: Multi-step problem solving and algebra

Students at this level can apply a range of reasoning skills to solve multi-step problems. They can solve routine problems involving fractions and percents, recognize properties of basic geometric figures, and work with exponents and square roots. They can solve a variety of two-step problems using variables, identify equivalent algebraic expressions, and solve linear equations and inequalities. They are developing an understanding of functions and coordinate systems.

Level 300: Moderately complex procedures and reasoning

Students at this level are developing an understanding of number systems. They can compute with decimals, simple fractions, and commonly encountered percents. They can identify geometric figures, measure lengths and angles, and calculate areas of rectangles. These students are also able to interpret simple inequalities, evaluate formulas, and solve simple linear equations. They can find averages, make decisions on information drawn from graphs, and use logical reasoning to solve problems. They are developing the skills to operate with signed numbers, exponents, and square roots.

Level 250: Numerical operations and beginning problem solving

Students at this level have an initial understanding of the four basic operations. They are able to apply whole number addition and subtraction skills to one-step word problems and money situations. In multiplication, they can find the product of a two-digit and a one-digit number. They can also compare information from graphs and charts, and are developing an ability to analyze simple logical relations.

Level 200: Beginning skills and understandings

Students at this level have considerable understanding of two-digit numbers. They can add two-digit numbers, but are still developing an ability to regroup in subtraction. They know some basic multiplication and division facts, recognize relations among coins, can read information from charts and graphs, and use simple measurement instruments. They are developing some reasoning skills.

Level 150: Simple arithmetic facts

Students at this level know some basic addition and subtraction facts, and most can add two-digit numbers without regrouping. They recognize simple situations in which addition and subtraction apply. They also are developing rudimentary classification skills.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, *Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1994; Mathematics, 1973 to 1994; Reading, 1971 to 1994; Writing, 1984 to 1994,* 1996.

Table 18-2 Average mathematics scale scores, by grade: 1990–96

Grade	1990	1992	1996
4th	213	[1]220	[1,2]224
8th	263	[1]268	[1,2]272
12th	294	[1]299	[1,2]304

[1]Statistically significant difference from 1990.

[2]Statistically significant difference from 1992.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *NAEP 1996 Mathematics Report Card for the Nation and the States: Findings from the National Assessment of Educational Progress*, 1997.

Table 18-3 Average mathematics scale scores of public school 4th- and 8th-graders, and change in scores from 1992, by grade and state: 1996

State or jurisdiction	Grade 4 Average scale score	Grade 4 Change from 1992 average scale score	Grade 8 Average scale score	Grade 8 Change from 1992 average scale score	Grade 8 Change from 1990 average scale score
Nation	**222**	**[2]4**	**271**	5	8
Alabama	212	3	257	4	4
Alaska[1]	224	—	278	—	—
Arizona[1]	218	2	268	3	[3]8
Arkansas	216	[2]6	262	[2]5	[3]5
California	209	1	263	2	[3]6
Colorado	226	[2]5	276	3	[3]8
Connecticut	232	[2]5	280	[2]6	[3]10
Delaware	215	[2]-3	267	[2]4	[3]6
District of Columbia	187	[2]-5	233	-2	1
Florida	216	2	264	4	[3]8
Georgia	215	0	262	3	4
Hawaii	215	1	262	[2]5	[3]11
Indiana	229	[2]8	276	[2]5	[3]8
Iowa[1]	229	-1	284	1	[3]6
Kentucky	220	[2]5	267	[2]4	[3]9
Lousiana	209	[2]5	252	2	[3]6
Maine	232	1	284	[2]5	—
Maryland	221	3	270	5	[3]9
Massachusetts	229	2	278	5	—
Michigan[1]	227	[2]6	277	[2]10	[3]12
Minnesota	232	[2]4	284	2	[3]9
Mississippi	208	[2]7	250	4	—
Missouri	225	3	273	2	—
Montana[1]	228	—	283	—	3
Nebraska	229	2	283	[2]5	[3]7
Nevada[1]	218	—	—	—	—
New Jersey[1]	228	0	—	—	—
New Mexico	214	1	262	2	[3]6
New York[1]	223	[2]4	270	4	[3]9
North Carolina	225	[2]11	268	[2]9	[3]17
North Dakota	231	2	284	1	3
Oregon	224	—	276	—	[3]5
Pennsylvania[1]	226	2	—	—	—
Rhode Island	220	[2]5	269	[2]3	[3]9
South Carolina[1]	213	1	261	0	—
Tennessee	219	[2]8	263	4	—
Texas	229	[2]11	270	[2]6	[3]12
Utah	227	2	277	2	—
Vermont[1]	225	—	279	—	—
Virginia	223	2	270	2	[3]5
Washington	226	—	276	—	—
West Virginia	223	[2]8	265	[2]6	[3]9
Wisconsin	231	3	283	5	[3]8
Wyoming	223	-2	275	0	[3]3

— State did not participate in the assessment in one or more years.

[1] State did not satisfy one or more of the guidelines for school participation rates in 1996.

[2] Change between 1992 and 1996 is statistically significant at the .05 level.

[3] Change between 1990 and 1996 is statistically significant at the .05 level.

SOURCE: U.S. Department of Education, National Center for Education Statistics,
NAEP 1996 Mathematics Report Card for the Nation and the States: Findings from the National Assessment of Educational Progress, 1997.

Table 18-4 Percentage of students scoring at or above five levels of mathematics proficiency: 1978, 1982, 1986, 1990, 1992, and 1994

Proficiency levels	Age	Year					
		1978	1982	1986	1990	1992	1994
Level 350:	9	0	0	0	0	0	0
Multi-step problem	13	1	0	˜0	˜0	0	1
solving and algebra	17	7	˜6	6	7	7	7
Level 300:	9	1	1	1	1	1	1
Moderately complex	13	18	17	˜16	17	19	21
procedures and reasoning	17	˜52	˜48	˜52	56	˜59	˜59
Level 250:	9	˜20	˜19	˜21	˜28	˜28	˜30
Numerical operations and	13	˜65	˜71	˜73	˜75	˜78	˜78
beginning problem solving	17	˜92	˜93	˜96	˜96	˜97	˜97
Level 200:	9	˜70	˜71	˜74	˜82	˜81	˜82
Beginning skills and	13	˜95	˜98	˜99	˜98	˜99	˜99
understandings	17	˜100	˜100	100	100	100	˜100
Level 150:	9	˜97	˜97	˜98	˜99	˜99	˜99
Simple arithmetic	13	˜100	100	100	100	100	˜100
facts	17	100	100	100	100	100	100

˜ Statistically significant difference from 1994.

¯ Statistically significant difference from 1978.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, *Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1994; Mathematics, 1973 to 1994; Reading, 1971 to 1994; Writing, 1984 to 1994,* 1996.

Table 18-5 Average mathematics proficiency scores, by age and parents' highest education level: 1978, 1982, 1986, 1990, 1992, and 1994

		Age 9		Age 13		Age 17	
Parents' highest education level	Year	Percentage of students	Average proficiency	Percentage of students	Average proficiency	Percentage of students	Average proficiency
Less than high school graduate	1978	‡8	‡200	‡12	‡245	‡13	280
	1982	‡8	‡199	‡11	‡251	‡14	279
	1986	‡4	201	‡8	‡252	‡8	279
	1990	‡5	‡210	‡8	‡253	‡8	285
	1992	‡4	‡217	‡6	‡256	‡8	286
	1994	‡4	‡210	‡6	‡254	‡7	284
Graduated from high school	1978	‡23	‡219	‡33	263	‡33	294
	1982	‡25	‡218	‡34	263	‡33	293
	1986	‡16	‡218	‡31	263	†‡28	293
	1990	‡16	‡226	†‡27	263	†‡26	294
	1992	‡14	222	‡23	263	‡21	298
	1994	‡14	‡225	‡23	266	‡22	295
Some education after high school	1978	‡9	‡230	‡14	‡273	‡16	305
	1982	‡9	‡225	‡14	275	‡18	304
	1986	‡7	‡229	16	274	‡24	305
	1990	7	236	‡17	‡277	‡24	308
	1992	8	‡237	‡18	‡278	‡25	308
	1994	‡7	‡239	‡17	‡277	‡24	305
Graduated from college	1978	‡24	‡231	‡26	284	‡32	317
	1982	†‡30	‡229	†‡32	282	‡32	†‡312
	1986	†‡38	‡231	†‡38	‡280	†‡37	314
	1990	‡40	‡238	†‡41	‡280	†‡39	316
	1992	‡42	‡236	‡44	283	‡43	316
	1994	‡45	‡238	‡46	285	‡44	318

‡ Statistically significant difference from 1994.

† Statistically significant difference from 1978.

NOTE: "Percentage of students" represents the percentage of all students in each subgroup. Not shown are about one-third of students at age 9 and smaller percentages at ages 13 and 17 who did not know their parents' highest education level.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, *Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1994; Mathematics, 1973 to 1994; Reading, 1971 to 1994; Writing, 1984 to 1994,* 1996.

Table 18-6 Percentile distribution of mathematics proficiency scores, by age and race/ethnicity: 1978, 1982, 1986, 1990, 1992, and 1994

	Age 9						Age 13						Age 17					
Percentile	1978	1982	1986	1990	1992	1994	1978	1982	1986	1990	1992	1994	1978	1982	1986	1990	1992	1994
All students																		
5	157	159	163	173	172	174	198	212	218	218	221	220	241	245	252	253	256	256
10	171	173	177	186	185	187	213	225	230	230	233	233	254	256	263	264	267	267
25	195	196	199	208	208	209	238	246	248	250	253	253	276	276	281	283	286	286
50	220	220	223	231	231	233	265	270	269	271	274	276	301	299	301	305	308	306
75	244	243	246	252	253	255	291	292	290	292	294	297	325	322	323	327	328	327
90	264	263	264	271	271	272	313	311	309	310	312	315	345	341	343	345	345	346
95	276	274	276	282	282	283	327	322	321	320	323	326	356	351	354	356	355	356
White																		
5	166	168	171	182	182	182	212	223	226	228	231	231	252	253	261	260	264	265
10	179	181	184	194	194	195	226	234	236	239	242	243	263	264	270	270	274	275
25	201	202	205	215	215	217	248	254	254	257	260	262	284	282	287	289	293	293
50	225	225	228	236	236	238	272	275	273	277	279	282	307	304	307	310	313	312
75	248	247	250	256	256	259	296	296	293	296	298	301	329	325	328	330	332	332
90	267	265	267	274	274	275	317	314	312	313	315	318	347	343	346	347	348	349
95	278	276	278	285	284	286	330	325	323	323	325	329	358	353	356	357	357	359
Black																		
5	134	137	146	156	155	160	170	189	202	202	200	202	217	225	237	245	238	241
10	147	150	158	167	166	171	184	200	213	212	212	213	228	234	244	254	249	251
25	169	172	180	186	186	191	206	219	231	230	231	231	246	251	260	269	267	268
50	193	197	203	208	209	213	229	241	249	249	251	251	268	271	279	287	287	286
75	216	218	224	231	230	234	254	261	267	268	271	271	290	291	296	307	304	303
90	236	237	241	249	249	252	276	280	284	285	286	292	310	311	312	326	321	317
95	248	248	251	259	259	262	288	291	296	296	297	304	321	321	325	338	331	326
Hispanic																		
5	144	148	155	162	159	159	180	202	206	206	212	209	224	232	236	229	248	244
10	156	161	164	173	169	170	192	214	216	216	224	219	234	241	248	242	258	254
25	179	181	185	193	190	190	214	231	236	234	241	238	253	255	265	264	273	271
50	204	205	206	216	212	211	237	252	254	255	259	256	275	275	283	282	292	290
75	227	226	226	235	234	230	262	274	274	275	279	274	298	297	301	304	311	311
90	250	246	245	252	253	249	284	293	292	292	295	293	320	315	319	325	328	329
95	260	257	254	262	263	259	296	304	301	303	304	304	332	327	329	336	336	338

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, *Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1994; Mathematics, 1973 to 1994; Reading, 1971 to 1994; Writing, 1984 to 1994,* 1996.

Table 18-7 Average mathematics proficiency scores, by age and grade: 1978, 1982, 1986, 1990, 1992, and 1994

Year	Below modal grade[1]		At modal grade[1]		Above modal grade[1]	
	Percentage	Proficiency	Percentage	Proficiency	Percentage	Proficiency
			Age 9			
1978	‘26	‘191	‘72	‘228	‘1	241
1982	30	‘193	‘69	‘230	1	258
1986	’34	‘’198	’66	‘’234	’’0	—
1990	’35	’207	’65	’242	’0	—
1992	’38	’208	’62	’242	’’0	—
1994	’33	’211	’66	’241	—	—
			Age 13			
1978	‘27	‘240	‘70	‘274	1	298
1982	‘28	‘’247	‘70	‘277	1	304
1986	33	‘’251	67	‘’278	1	297
1990	’36	‘’253	’63	’280	1	278
1992	’37	’258	’62	’282	’0	—
1994	’38	’259	’62	’283	—	—
			Age 17			
1978	‘15	‘273	75	‘305	‘10	‘309
1982	‘16	‘274	75	‘302	‘10	‘306
1986	17	‘277	75	‘307	8	309
1990	’22	’282	’70	’311	8	311
1992	’24	’285	’70	’313	’6	’318
1994	’21	’284	73	’312	’6	’316

— Too few sample observations for a reliable estimate.

[1] The modal grade is the most common grade level for students of a particular age. For example, the modal grade at age 9 is fourth grade. Nine-year-olds in fifth grade are above the modal grade for their age, and 9-year-olds in third grade are below the modal grade for their age.

‘ Statistically significant difference from 1994.

’ Statistically significant difference from 1978.

’ Percentages less than 0.5 are rounded to 0.0.

NOTE: The modal grades are grade 4 at age 9, grade 8 at age 13, and grade 11 at age 17. The modal grade is lower for 17-year-olds because of differences in age definition and in the time of year the test is given, causing more students to be above the modal grade at age 17 than at any other age. For a more complete explanation, see the supplemental note to *Indicator 15*.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, *Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1994; Mathematics, 1973 to 1994; Reading, 1971 to 1994; Writing, 1984 to 1994*, 1996.

Table S18-1 Standard errors for table 18-2

Grade	1990	1992	1996
4th	0.9	0.7	0.9
8th	1.3	0.9	1.1
12th	1.1	0.9	1.0

SOURCE: U.S. Department of Education, National Center for Education Statistics, *NAEP 1996 Mathematics Report Card for the Nation and the States: Findings from the National Assessment of Educational Progress*, 1997.

Table S18-2 Standard errors for table 18-3

State or jurisdiction	Grade 4 Average scale score	Grade 4 Change from 1992 average scale score	Grade 8 Average scale score	Grade 8 Change from 1992 average scale score	Grade 8 Change from 1990 average scale score
Nation	1.0	1.3	1.2	1.6	1.8
Alabama	1.2	2.0	2.1	2.7	2.4
Alaska	1.3	—	1.8	—	—
Arizona	1.7	2.0	1.6	2.0	2.1
Arkansas	1.5	1.7	1.5	1.9	1.8
California	1.8	2.4	1.9	2.5	2.3
Colorado	1.0	1.4	1.1	1.5	1.4
Connecticut	1.1	1.6	1.1	1.6	1.5
Delaware	0.6	1.0	0.9	1.4	1.3
District of Columbia	1.1	1.2	1.3	1.6	1.6
Florida	1.2	1.9	1.8	2.3	2.2
Georgia	1.5	1.9	1.6	2.0	2.1
Hawaii	1.5	2.0	1.0	1.3	1.3
Indiana	1.0	1.5	1.4	1.8	1.8
Iowa	1.1	1.5	1.3	1.7	1.7
Kentucky	1.1	1.5	1.1	1.5	1.6
Lousiana	1.1	1.8	1.6	2.3	2.0
Maine	1.0	1.4	1.3	1.6	—
Maryland	1.6	2.0	2.1	2.5	2.6
Massachusetts	1.4	1.8	1.7	2.0	—
Michigan	1.3	2.1	1.8	2.3	2.2
Minnesota	1.1	1.4	1.3	1.7	1.6
Mississippi	1.2	1.6	1.2	1.7	—
Missouri	1.1	1.6	1.4	1.8	—
Montana	1.2	—	1.3	—	1.6
Nebraska	1.2	1.7	1.0	1.5	1.5
Nevada	1.3	—	—	—	1.4
New Jersey	1.5	2.1	—	—	2.2
New Mexico	1.8	2.3	1.2	1.5	1.5
New York	1.2	1.8	1.7	2.7	2.7
North Carolina	1.2	1.6	1.4	1.8	1.8
North Dakota	1.2	1.4	0.9	1.5	1.5
Oregon	1.4	—	1.5	—	1.8
Pennsylvania	1.2	1.8	—	—	—
Rhode Island	1.4	2.1	0.9	1.2	1.1
South Carolina	1.3	1.7	1.5	1.8	—
Tennessee	1.4	1.9	1.4	2.0	—
Texas	1.4	1.8	1.4	1.9	2.0
Utah	1.2	1.5	1.0	1.3	—
Vermont	1.2	—	1.0	—	—
Virginia	1.4	1.9	1.6	1.9	2.2
Washington	1.2	—	1.3	—	—
West Virginia	1.0	1.5	1.0	1.4	1.4
Wisconsin	1.0	1.4	1.5	2.1	2.0
Wyoming	1.4	1.7	0.9	1.2	1.1

— Not available.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *NAEP 1996 Mathematics Report Card for the Nation and the States: Findings from the National Assessment of Educational Progress*, 1997.

Table S18-3 Standard errors for table 18-4

Proficiency levels	Age	Year					
		1978	1982	1986	1990	1992	1994
Level 350:	9	0.0	0.0	0.0	0.0	0.0	0.0
Multi-step problem	13	0.2	0.1	0.1	0.1	0.2	0.2
solving and algebra	17	0.4	0.4	0.5	0.6	0.6	0.8
Level 300:	9	0.1	0.1	0.2	0.3	0.3	0.4
Moderately complex	13	0.7	0.9	1.0	1.0	1.0	1.4
procedures and reasoning	17	1.1	1.3	1.4	1.4	1.3	1.4
Level 250:	9	0.7	1.0	0.9	0.9	0.9	1.1
Numerical operations and	13	1.2	1.2	1.6	1.0	1.1	1.1
beginning problem solving	17	0.5	0.5	0.5	0.5	0.5	0.5
Level 200:	9	0.9	1.2	1.2	1.0	0.8	0.7
Beginning skills and	13	0.5	0.4	0.2	0.2	0.3	0.3
understandings	17	0.1	0.0	0.1	0.1	0.0	0.0
Level 150:	9	0.3	0.3	0.3	0.2	0.2	0.2
Simple arithmetic	13	0.1	0.0	0.0	0.0	0.0	0.0
facts	17	0.0	0.0	0.0	0.0	0.0	0.0

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, *Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1994; Mathematics, 1973 to 1994; Reading, 1971 to 1994; Writing, 1984 to 1994*, 1996.

Table S18-4 Standard errors for table 18-5

Parents' highest education level	Year	Age 9 Percentage of students	Age 9 Average proficiency	Age 13 Percentage of students	Age 13 Average proficiency	Age 17 Percentage of students	Age 17 Average proficiency
Less than high school graduate	1978	0.4	1.5	0.6	1.2	0.6	1.2
	1982	0.7	1.7	0.6	1.4	0.9	1.0
	1986	0.4	2.5	1.0	2.3	0.4	2.3
	1990	0.4	2.3	0.5	1.8	0.6	2.2
	1992	0.3	2.2	0.5	1.0	0.6	2.3
	1994	0.4	3.0	0.4	2.1	0.5	2.4
Graduated from high school	1978	0.8	1.1	0.8	1.0	0.7	0.8
	1982	0.8	1.1	0.8	0.8	0.8	0.8
	1986	0.7	1.6	1.2	1.2	1.1	1.0
	1990	0.7	1.2	0.8	1.2	1.1	0.9
	1992	0.7	1.5	0.9	1.2	0.9	1.7
	1994	0.6	1.3	0.9	1.1	0.8	1.1
Some education after high school	1978	0.4	1.7	0.4	1.2	0.4	0.9
	1982	0.4	2.1	0.4	0.9	0.5	0.9
	1986	0.6	2.1	0.6	0.8	1.0	1.2
	1990	0.4	2.0	0.6	1.0	0.9	1.0
	1992	0.4	1.9	0.7	1.0	0.9	1.1
	1994	0.4	2.1	0.6	1.6	1.1	1.3
Graduated from college	1978	1.1	1.1	1.2	1.2	1.1	1.0
	1982	1.5	1.5	1.3	1.5	1.3	1.0
	1986	1.1	1.1	2.0	1.4	1.2	1.4
	1990	1.1	1.3	1.2	1.0	1.4	1.3
	1992	1.2	1.0	1.3	1.0	1.4	1.0
	1994	0.8	0.8	1.3	1.2	1.5	1.4

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, *Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1994; Mathematics, 1973 to 1994; Reading, 1971 to 1994; Writing, 1984 to 1994,* 1996.

Table S18-5 Standard errors for table 18-6

Percentile	Age 9						Age 13						Age 17					
	1978	1982	1986	1990	1992	1994	1978	1982	1986	1990	1992	1994	1978	1982	1986	1990	1992	1994
All students																		
5	1.0	1.8	1.3	2.6	1.6	1.4	1.6	2.7	1.8	2.2	2.0	2.0	1.3	1.1	1.2	1.0	2.1	1.9
10	1.2	1.8	1.5	2.2	1.2	1.4	1.5	1.6	1.4	1.4	1.2	1.4	1.1	1.0	1.0	1.1	1.6	1.0
25	1.0	1.1	1.6	1.3	1.2	0.9	1.3	1.2	1.8	0.9	1.1	1.3	1.2	1.3	0.6	1.0	1.2	1.0
50	1.0	1.2	1.1	0.9	0.8	1.1	1.1	1.0	1.3	1.0	0.7	0.9	1.1	1.0	1.3	1.1	1.0	1.2
75	0.9	1.4	1.2	0.7	0.8	0.8	1.1	1.1	1.3	1.0	1.0	1.2	1.0	0.8	1.9	1.2	1.0	1.2
90	1.2	1.0	1.3	1.0	1.3	1.0	1.2	1.2	1.5	1.0	1.6	1.2	0.8	0.9	1.3	1.3	1.1	1.5
95	1.2	1.3	1.2	1.3	1.2	1.1	1.3	1.2	2.2	1.6	1.2	1.5	0.9	1.1	1.1	2.2	1.0	1.7
White																		
5	1.5	1.4	2.4	2.4	1.5	2.4	1.4	1.6	1.5	1.5	1.6	1.0	0.6	1.1	1.6	1.3	2.0	1.7
10	1.5	1.7	1.7	1.6	1.5	1.1	1.4	1.2	1.3	1.0	1.4	1.1	1.3	1.1	1.3	1.5	1.4	1.7
25	1.1	1.3	1.1	0.9	0.9	1.3	0.9	1.1	1.4	1.1	0.8	1.1	1.0	1.1	1.2	1.5	1.1	1.5
50	1.0	1.4	1.1	1.0	1.1	1.1	1.0	0.9	1.0	1.0	1.0	1.2	1.0	1.2	1.3	1.3	1.0	1.3
75	0.8	0.9	0.8	0.6	1.0	1.1	0.7	1.0	1.3	1.1	1.1	1.3	0.8	0.9	1.7	1.2	1.0	1.2
90	1.1	1.0	1.2	0.8	1.3	1.1	1.2	1.4	2.2	1.3	1.3	1.5	0.7	1.1	1.3	1.0	1.0	1.6
95	1.7	1.3	1.8	2.1	1.6	1.2	1.3	1.4	1.8	1.6	1.4	1.7	0.7	1.5	1.4	1.3	1.2	1.8
Black																		
5	1.9	2.5	3.2	1.7	3.4	3.8	1.9	4.3	4.5	5.4	4.5	7.7	2.0	1.4	3.9	4.4	4.3	5.7
10	1.7	2.3	4.9	3.7	2.9	3.0	2.6	3.7	2.3	2.2	5.1	3.8	1.7	1.7	4.2	3.5	6.9	1.9
25	1.9	2.0	4.1	4.1	2.4	1.7	1.9	1.8	2.2	3.0	3.0	3.6	1.2	1.6	1.6	1.8	3.8	2.5
50	1.1	2.0	1.6	3.1	2.1	1.7	2.2	1.9	2.3	2.0	1.9	3.8	1.6	1.4	3.9	2.5	1.9	2.1
75	1.6	2.0	2.0	2.1	2.0	1.0	2.2	1.4	1.5	2.9	1.8	4.8	2.2	1.7	2.5	5.3	3.9	2.0
90	1.6	2.5	1.7	2.9	2.1	5.2	2.4	2.2	3.7	2.8	2.1	3.5	2.1	1.7	7.4	5.8	2.3	4.1
95	1.4	2.8	1.3	4.3	3.4	2.2	3.9	1.7	4.3	4.1	3.5	8.3	2.5	2.2	4.1	4.2	3.0	6.5
Hispanic																		
5	5.4	2.8	3.7	3.4	4.4	3.3	1.8	2.2	3.6	3.7	3.5	2.8	4.4	1.7	5.3	5.4	4.3	5.1
10	3.7	3.2	1.8	1.4	3.5	4.1	2.2	2.6	3.8	3.1	2.4	3.0	2.9	3.2	4.5	8.1	3.5	5.8
25	3.2	2.3	3.2	3.6	2.2	3.0	1.8	1.9	2.7	2.2	3.2	2.3	1.8	2.4	2.8	6.8	4.5	3.8
50	3.0	1.6	2.4	4.1	3.5	2.5	2.0	1.4	3.4	1.9	2.3	1.6	3.6	3.2	2.5	2.4	3.4	5.4
75	2.5	2.0	3.8	3.3	3.4	3.8	3.2	1.4	2.4	3.5	2.9	2.2	3.9	2.6	4.2	4.4	3.7	5.5
90	4.0	3.4	3.8	3.4	3.8	4.4	3.4	2.4	3.1	2.9	1.6	2.3	3.9	2.6	2.3	3.6	4.8	3.6
95	4.6	2.9	4.6	3.5	6.8	7.3	3.1	2.9	1.9	3.3	3.2	9.7	0.9	4.4	7.3	8.6	2.7	2.9

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, *Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1994; Mathematics, 1973 to 1994; Reading, 1971 to 1994; Writing, 1984 to 1994,* 1996.

Table S18-6 Standard errors for table 18-7

Year	Below modal grade		At modal grade		Above modal grade	
	Percentage	Proficiency	Percentage	Proficiency	Percentage	Proficiency
			Age 9			
1978	0.9	1.1	0.9	0.9	0.2	7.1
1982	1.5	1.4	1.5	1.0	0.1	9.3
1986	1.7	1.0	1.7	1.0	0.1	—
1990	1.4	1.2	1.4	1.0	0.1	—
1992	1.2	1.2	1.2	0.7	0.1	—
1994	1.3	1.1	1.3	1.0	—	—
			Age 13			
1978	1.1	1.4	1.1	1.1	0.7	9.1
1982	1.4	1.4	1.4	0.9	1.4	6.3
1986	2.1	1.1	2.1	1.0	0.5	7.7
1990	1.3	1.0	1.4	0.9	0.5	16.5
1992	1.1	1.3	1.0	0.9	0.2	—
1994	1.3	1.2	1.3	1.0	—	—
			Age 17			
1978	0.6	1.1	0.7	1.0	0.5	1.0
1982	1.0	1.6	1.0	0.9	0.7	1.4
1986	0.9	1.6	1.2	0.9	0.7	3.0
1990	1.0	1.7	1.0	0.8	0.6	1.8
1992	1.1	1.4	1.0	0.8	0.5	2.4
1994	1.6	1.6	1.7	0.9	0.6	3.1

— Not available.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, *Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1994; Mathematics, 1973 to 1994; Reading, 1971 to 1994; Writing, 1984 to 1994*, 1996.

Table S18(a) Standard errors for the first text table in *Indicator 18*

	Total			Male			Female		
Year	Age 9	Age 13	Age 17	Age 9	Age 13	Age 17	Age 9	Age 13	Age 17
1973	0.8	0.8	1.1	0.7	1.3	1.2	1.1	1.1	1.1
1978	0.8	1.1	1.0	0.7	1.3	1.0	1.0	1.1	1.0
1982	1.1	1.1	0.9	1.2	1.4	1.0	1.2	1.1	1.0
1986	1.0	1.2	0.9	1.1	1.1	1.2	1.2	1.5	1.0
1990	0.8	0.9	0.9	0.9	1.2	1.1	1.1	0.9	1.1
1992	0.8	0.9	0.9	1.0	1.1	1.1	1.0	1.0	1.1
1994	0.8	1.0	1.0	1.0	1.3	1.4	0.9	1.0	1.1

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, *Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1994; Mathematics, 1973 to 1994; Reading, 1971 to 1994; Writing, 1984 to 1994,* 1996.

Table S18(b) Standard errors for the second text table in *Indicator 18*

Year	White			Black			Hispanic		
	Age 9	Age 13	Age 17	Age 9	Age 13	Age 17	Age 9	Age 13	Age 17
1973	1.0	0.9	1.1	1.8	1.9	1.3	2.4	2.2	2.2
1978	0.9	0.8	0.9	1.1	1.9	1.3	2.2	2.0	2.3
1982	1.1	1.0	0.9	1.6	1.6	1.2	1.3	1.7	1.8
1986	1.1	1.3	1.0	1.6	2.3	2.1	2.1	2.9	2.9
1990	0.8	1.1	1.0	2.2	2.3	2.8	2.1	1.8	2.9
1992	0.8	0.9	0.8	2.0	1.9	2.2	2.3	1.8	2.6
1994	1.0	0.9	1.1	1.6	3.5	1.8	2.3	1.9	3.7

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, *Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1994; Mathematics, 1973 to 1994; Reading, 1971 to 1994; Writing, 1984 to 1994,* 1996.

Average mathematics proficiency (scale score), by sex and age: Selected years 1973–94

	Total			Male			Female		
Year	Age 9	Age 13	Age 17	Age 9	Age 13	Age 17	Age 9	Age 13	Age 17
1973	[1]219	[1]266	304	[1]218	[1]265	309	[1]220	[1]267	301
1978	[2]219	[2]264	[2]300	[2]217	[2]264	[2,3]304	[2]220	[2]265	[2]297
1982	[2]219	[2]269	[2,3]298	[2]217	[2]269	[2,3]302	[2]221	[2]268	[2,3]296
1986	[2]222	[2]269	[2]302	[2,3]222	[2,3]270	305	[2]222	[2]268	[2]299
1990	[2]230	[2,3]270	305	[2]229	[2,3]271	306	[2]230	270	303
1992	[2]230	[2]273	307	[2]231	[2]274	309	[2]228	[2]272	[2]305
1994	[2]231	[2]274	306	[2]232	[2]276	309	[2]230	[2]273	304

[1] Statistically significant difference from 1994.

[2] Statistically significant difference from 1973.

[3] Revised from previously published figures.

NOTE: Mathematics proficiency scale has a range of 0 to 500. (See supplemental table 18-1 for detailed explanations of levels.)

Level 150: Simple arithmetic facts

Level 200: Beginning skills and understandings

Level 250: Numerical operations and beginning problem solving

Level 300: Moderately complex procedures and reasoning

Level 350: Multi-step problem solving and algebra

SOURCE: Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, *Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1994; Mathematics, 1973 to 1994; Reading, 1971 to 1994; Writing, 1984 to 1994,* 1996.

Average mathematics proficiency (scale score), by race and age: Selected years 1973–94

	White			Black			Hispanic		
Year	Age 9	Age 13	Age 17	Age 9	Age 13	Age 17	Age 9	Age 13	Age 17
1973	[1]225	[1]274	310	[1]190	[1]228	[1]270	[1]202	[1]239	[1]277
1978	[1]224	[1]272	[1][2]306	[1]192	[1]230	[1]268	203	[1]238	[1]276
1982	[1]224	[1]274	[1][2]304	[1]195	[1][2]240	[1]272	204	[1]252	[1]277
1986	[1]227	[1]274	[1]308	[1][2]202	[1]249	[1]279	205	[1]254	283
1990	[1]235	[1]276	310	[1]208	[1]249	[1]288	[1]214	[1]255	284
1992	[1]235	[1]279	312	[1]208	[1]250	[1]286	[1]212	[1]259	[1]292
1994	[1]237	[1]281	312	[1]212	[1]252	[1]286	[1]210	[1]256	[1]291

[1] Statistically significant difference from 1994.

[2] Statistically significant difference from 1973.

NOTE: Mathematics proficiency scale has a range of 0 to 500. (See supplemental table 18-1 for detailed explanations of levels.)

Level 150: Simple arithmetic facts

Level 200: Beginning skills and understandings

Level 250: Numerical operations and beginning problem solving

Level 300: Moderately complex procedures and reasoning

Level 350: Multi-step problem solving and algebra

SOURCE: Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, *Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1994; Mathematics, 1973 to 1994; Reading, 1971 to 1994; Writing, 1984 to 1994,* 1996.